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RADIATION BELTS

by

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RADIATION BELTS

[REVIEW]

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by V. P. Shabanskiy

ABSTRACT

This major review paper covers the information on trapped radiation based upon data up to April 1964.- Then, the representation on the structure of the Earth's magnetosphere is the object of detailed description.

The paper is divided in six sections, as follows :

1. - THE PROTON COMPONENT

The most important result here is the establishment for the proton component of the energy spectrum and of spatial distribution of protons of various energies.

The author's review is based upon the references [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]. He concludes that there still are gaps in the general distribution pattern of protons with various energies along magnetic shells.

2. - ELECTRON COMPONENT

The review starts from the discovery of the outer belt by Explorer-I and III, through the final confirmation by the results of Explorer-XII of the intensity range of electron fluxes [16 - 26].

It was thus found that the total flux of electrons with $E_e > 45$ kev in the outer belt maximum is $\sim 10^8 \text{ cm}^{-2} \cdot \text{sec}^{-1}$. Although this result was not unexpected, its importance cannot be minimized, for the magnetic spectrometer installed on Explorer-XII allowed to lift the remaining doubts relative to the error of initial interpretation of the results of radiation observation with the aid of counters.

Then began a new stage in the study of the outer radiation belt. The author reviews successively the high-energy component, electrons of medium and low energy, covering references [27 - 48]. It includes the considerations on the "artificial" belt and the so-called "outermost" belt, of which the name is no longer justified because of the implication of trapped particles.

3. - LOSSES OF PARTICLES

The author reviews the various processes of particle leakage, basing himself on references [49] though [67].

Under items 4 and 5 he reviews successively the Albedo hypotheses

of the origin of protons and electrons trapped by the geomagnetic field. These 2 sections cover the references [69 — 93].

6. MOTION OF PARTICLES IN THE MAGNETOSPHERE

This analysis, covering references [95 — 113], allows a general representation of the entire structure of the magnetosphere.

The review includes 113 scientific literature references, constituting a very complete bibliography covering the subject under discussion. There are moreover 12 figures, mostly borrowed from our own scientific reports.

***** END OF ABSTRACT *****

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